

Cosmetic Requirement of Mechanical Parts, Line Replaceable Units and Outside Antenna Equipment

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Revision J

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Cosmetic Requirement of Mechanical Parts, Line Replaceable Units & Outside Antenna Equipment

REVISION HISTORY

Rev	By	Section	Description	Date
A	J. Park	ALL	Initial Release	2010-12-29
B	J. Park	4.1	Update 4.1 Class A Surface Spec	2011-06-27
C	J. Park	1.3.1	Add SPI Mold Finish Guide Spec	2011-08-13
D	J. Park	1.3.1 & ALL	Section 1.3.1: Was: Definition of Classification Is: Surface Classification and Requirements Update to new Zii format	2015-09-30
E	G. Seal, S. Lao, S. Parrish, S. Uota	ALL	General rewrite and clarification; separated tables into General, Plastics, Metals and textures	2018-05-18
F	G. Seal, S. Lao, S. Parrish, D. Dang, S. Uota	ALL	Add picture examples. Defined Class D surface. Added Blemish and Overspray conditions.	2019-03-18
G	S. Uota	2.1, Table 5	Add requirements for Dry lubricant coating requirements	2019-08-05
H	B. Esmaeilpour	All	Updated format to Safran standard format. Added glue cosmetic section and updated Class B definition	2021-09-27
J	W. Guinto	All	Changed the title to Cosmetic Requirement of Mechanical Parts, Line Replaceable Units and Outside Antenna Equipment. Changed the Purpose and Scope and divided the cosmetic requirement into two categories.	2024-11-06

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1. Purpose

The purpose of this cosmetic requirement is to define common defects and establish the acceptance criteria for different surfaces of Mechanical Parts, Line Replaceable Units and Outside Antenna Equipment.

2. Scope

This cosmetic requirement is divided into two categories as follows:

CATEGORY A: MECHANICAL PARTS & LINE REPLACEABLE UNITS (LRU)

CATEGORY B: OUTSIDE ANTENNA EQUIPMENT (Radome, Skirt & Adapter Plate)

The criterion on each category addresses the cosmetic requirements specific to drawings that call out the 28-0002-00 document and Source Control Drawings from Suppliers.

3. CATEGORY A: MECHANICAL PARTS & LINE REPLACEABLE UNITS (LRU)

3.1. COSMETIC ACCEPTANCE CRITERIA

3.1.1. SURFACE CLASSIFICATION AND REQUIREMENTS

The specification criteria are separated into four classifications A, B, C, and D based on function of the piece part and by location of the LRU.

3.1.1.1. Class A Surface (external-high priority)

Class A refers to surfaces that are readily visible by the passenger and have a high gloss or have an optical component and viewed from standard viewing conditions as defined in Section 3.1.2.

3.1.1.2. Class B Surface

Class B (Customer facing) refers to surfaces that are readily visible by the passenger. This can include galley's, under seats and inside overhead bins.

Class B (Non-Customer-facing) refers to external surfaces that are not readily visible by the passenger. This surface may exhibit some minor cosmetic defects which may be visible to the inspector when viewed from standard viewing conditions as defined in Section 3.1.2.

These surfaces include but are not limited to the back of the display, non-visible DDS surfaces, etc. Refer to appendix C for pictorial examples of customer facing and non-customer facing surfaces.

Unless otherwise specified, any class B surface without further clarification should be considered as a "customer facing" surface.

3.1.1.3. Class C Surface (internal or external – medium priority surface)

Class C refers to surfaces that are not readily visible by the passenger. This surface may exhibit some minor cosmetic defects which may be visible to the inspector when viewed from standard viewing conditions as defined in Section 3.1.2.

3.1.1.4. Class D Surface: (predominantly internal)

Class D refers to surfaces that will never be visible by the passenger. Undesignated surfaces on the drawing, by default, are classified as Class D. This surface may

exhibit some minor cosmetic defects which may be visible to the inspector when viewed from standard viewing conditions as defined in Section 3.1.2.

3.1.2. STANDARD VIEWING CONDITION

Piece parts: All quality decisions of cosmetic acceptability will be made under normal lighting conditions (80-120 foot-candles) in white fluorescent light, viewed at a distance of 18-20 inches, and under no additional magnification. Viewing time should be less than 20 seconds per feature or unit. Cosmetic inspection is to be performed via non-destructive methods.

LRU Parts: All quality decisions of cosmetic acceptability will be made under normal lighting conditions (80-120 foot-candles) in white fluorescent light, viewed at an angle similar to a seated or standing passenger. Viewing time should be less than 20 seconds per feature. Cosmetic inspection is to be performed via non-destructive methods.

3.1.3. COLOR MATCHING

Decisions regarding color matching are made by comparison to known standards using a spectrophotometer, color meter or suitable color matching coupons.

3.1.4. SURFACE FINISH AND TEXTURE MATCHING

Judgement as to the conformance of surface finish and texture is to be made by comparing a part to an SPI Mold Finish Guide coupon, equivalent coupon sample or identified known standard. Comparison is by unaided eye unless otherwise specified by the standard.

3.2 INSPECTION CRITERIA

3.2.1. INSPECTION CRITERIA DEFECTS AS SHOWN IN TABLES 1, 2, & 3

TABLE 1: GENERAL DEFECTS

1. - Finish
2. - Broken
3. - Cracking
4. - Nicks
5. - Scratch
6. - Flash
7. - Manufacturing Processing Marks
8. - FOD
9. - Welds
10. - Printing

TABLE 2: PLASTIC DEFECTS

11. - Flow Marks
12. - Drag Marks
13. - Short Shot
14. - Sink Marks
15. - Weld lines
16. - Crazeing
17. - Blemish

TABLE 3: METAL DEFECTS

18. - Flow Marks

- 19. - Drag Marks
- 20. - Short Shots
- 21. - Sinks
- 22. - Grease
- 23. - Manufacturing Processing Marks
- 24. - Porosity or Pitting
- 25. - Sheet metal bulging

TABLE 4: TEXTURE AND COATING FINISH

- 26. - Color
- 27. - Texture
- 28. - Hanging/Drying Marks
- 29. - Flaking
- 30. - Overspray
- 31. - Wrinkling/Blistering

Table 5: DRY LUBRICANT COATING FINISH

- 32. - Texture
- 33. - Coverage
- 34. - Color
- 35. - Thickness

Table 6: ADHESIVE AND GLUED SURFACE FINISH

- 36. - Protrusion above surface

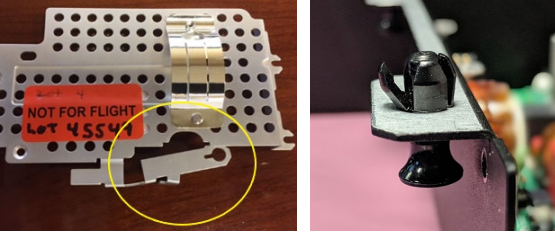
Table 7: DELAMINATION/DEBONDING

- 37. – Delamination/Debonding

Table 8: - GAP

- 38. – Gap

Table 1: General Defects

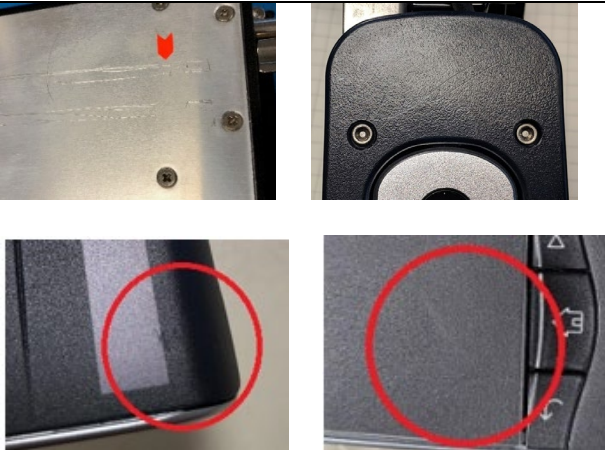
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
1	FINISH: Any deviation from surface roughness or texture such as to immediately focus the attention of the viewer upon them. A noncontinuous or inconsistent surface finish or texture.	None allowed	None allowed	May deviate slightly or exhibit minor imperfections from a specified finish guide or texture plaque.	No specific finish requirement	
2	BROKEN: General damage. Bent/broken tabs or ribs.	None allowed	None allowed	None allowed	None allowed	
3	CRACKING: Stress induced splitting or fissures causing separation of material.	None allowed	None allowed	None allowed.	None allowed.	

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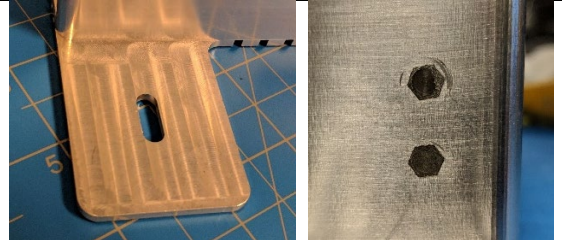
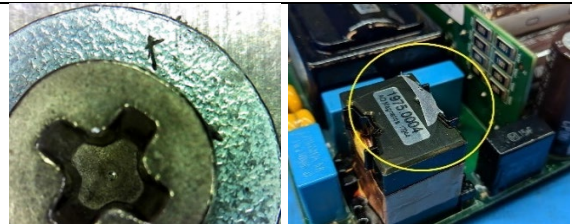
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
4	NICK: Like gouges but of short length. Cause by impact rather than abrasion.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Allowed (See Appendix A)	Allowable: See Appendix A	Allowable, as long as the nick does not affect FFF.	
5	SCRATCH: Surface imperfection due to abrasion that removes small amounts of material. Depth may or may not be measurable.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Allowed (See Appendix A)	Allowable: See Appendix A	Allowable, as long as the scratch(es) does not affect FFF.	
6	FLASH: Excess material at parting line or mating surface of the mold.	None allowed	.003" or less in any direction. Edges must adhere to UL1439 standard.	.005" or less in any direction. Must adhere to UL1439 standard, FFF is not affected	.005" or less in any direction. Must adhere to UL1439 standard, FFF is not affected	

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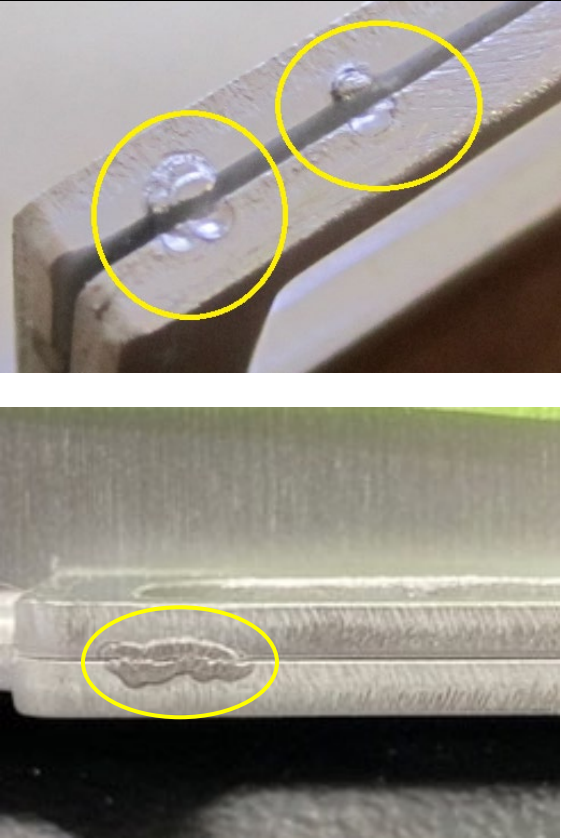
				and cannot produce FOD	and cannot produce FOD	
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
7	MANUFACTURING PROCESSING MARKS (including as seen through paint/powder coat surfaces): Marks left from a manufacturing process or fixture used in the manufacture of an item.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Allowed if the part still meets the print/model dimensions and tolerances. Cannot affect FFF.	Allowed if the part still meets the print/model dimensions and tolerances. Cannot affect FFF.	Allowed if the part still meets the print/model dimensions and tolerances. Cannot affect FFF.	
8	FOD – Including cutting oils, mold release, cleaning agents.	None allowed	None allowed	None allowed	None allowed	

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Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
9	WELDS: Tack, bead, seam, laser, spot or chemical weld/bonding.	No evidence of weld or bonding allowed	May be visible unless otherwise noted. If allowed, it must be continuous and consistent in size with no cracks or voids through the weld. Cannot distort surrounding material	Must be continuous with no cracks through the weld. Cannot affect FFF of the final product. Cannot distort any surrounding Class A or B surface.	Must be continuous with no cracks through the weld. Cannot affect FFF of the final product. Can not distort any surrounding Class A, B or C surface.	

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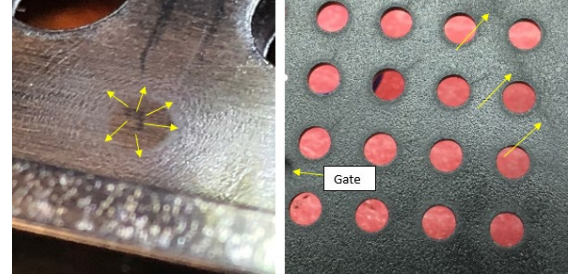
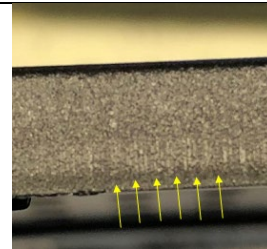


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Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
10	PRINTING: Labels, symbols, marking, etching and printed details.	All characters and symbols must be fully formed and human readable with an unaided eye. All barcodes must be scannable.	All characters and symbols must be fully formed and human readable with an unaided eye. All barcodes must be scannable.	All characters and symbols must be fully formed and human readable with an unaided eye. All barcodes must be scannable.	All characters and symbols must be fully formed and human readable with an unaided eye. All barcodes must be scannable.	 The example image shows a label for 'Zodiac Inflight Innovations SEAT POWER UNIT 3 (SPU3)'. It includes part numbers (PNR 00-5024-51, SER 000103, DMF 111417), a modification code (MFR 3FGZ1), and a barcode. A yellow circle highlights a defect in the barcode area, specifically in the '00000000' sequence.

*Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.

Table 2: Plastic Defects

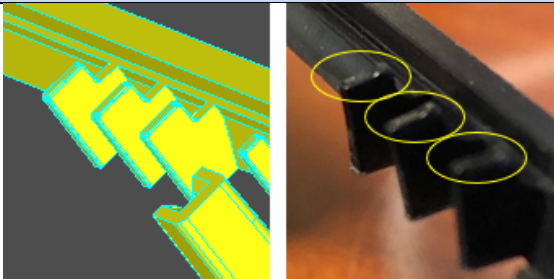
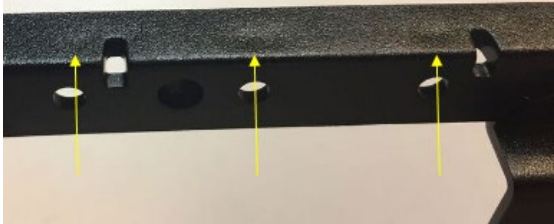
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
11	FLOW MARKS: Waviness of edge or excessive linear junction between venting of gases generated during the molding cycle.	None allowed	Customer Facing: None allowed. Non-Customer Facing: .50" or less in any direction is acceptable. Allow 4 per surface. No closer than 1 inch.	.50" or less in any direction is acceptable. Allow 4 per surface. No closer than 1 inch.	.50" or less in any direction is acceptable.	
12	DRAG MARKS: Clusters of scratches from plastic dragging against mold or another hard surface.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Acceptable if drawing and model dimensions are not violated and FFF is not affected	Acceptable if drawing and model dimensions are not violated and FFF is not affected	Acceptable if drawing and model dimensions are not violated and FFF is not affected	

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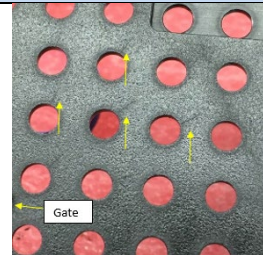
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
13	SHORT SHOT: Missing plastic due to incomplete filling of the mold cavity. Parts are not completely formed.	None allowed	None allowed	None allowed	None allowed	
14	SINK: Surface depression such as voids or cavities.	None allowed	Customer Facing: .005" Max. and cannot affect FFF and cannot affect an adjacent Class A surface. Non-Customer Facing: .015" Max. and cannot affect FFF and cannot affect an adjacent Class A or B surface.	.015" Max. and cannot affect FFF and cannot affect an adjacent Class A or B surface.	.015" Max. and cannot affect FFF and cannot affect an adjacent Class A, B or C surface.	

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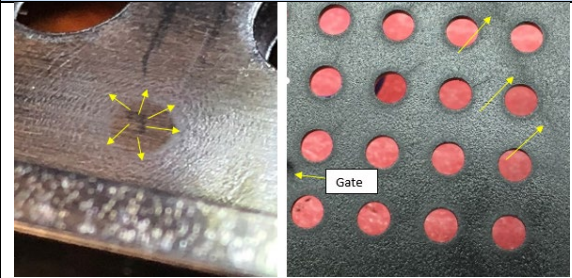
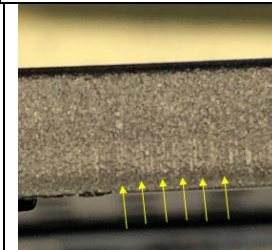


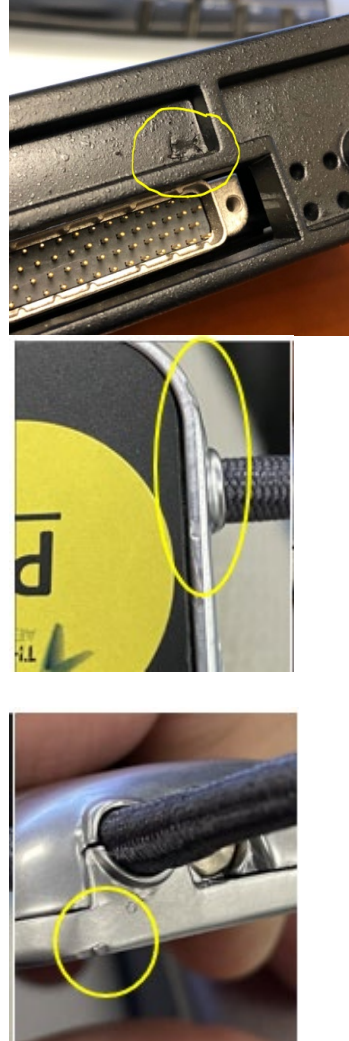
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Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
15	WELD LINES: Witness line where 2 or more fronts of molten plastic converge.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Allowed but cannot propagate through the material in the form of a void or crack.	Allowed but cannot propagate through the material in the form of a void or crack.	Allowed but cannot propagate through the material in the form of a void or crack.	
16	CRAZING: Multiple tiny cracks due to stress exerted on the part.	None allowed	None allowed	None allowed	None allowed	
17	BLEMISH: A variation in the surface texture that can be seen but no felt. This can affect sheen or gloss and sometimes color.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Acceptable but should be kept to a minimum via design or process control.	Acceptable, but should be kept to a minimum via design or process control.	No specific texture requirement	

***Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.**

Table 3: Metal Defects

Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
18	FLOW MARKS: Waviness of edge or lines along surface. Normally seen in castings	None allowed	Customer Facing: None allowed. Non-Customer Facing: .50" in any direction or less. Allow 4 per surface. No closer than 1 inch.	.50" in any direction or less. Allow 4 per surface. No closer than 1 inch.	.50" in any direction or less.	
19	DRAG MARKS: Clusters of scratches from metal dragging against mold details when a part is ejected from a mold.	None allowed	Customer Facing: None allowed. Non-Customer Facing: Acceptable if dimensions, tolerance and model are not violated.	Acceptable if dimensions, tolerance and model are not violated.	Acceptable if dimensions, tolerance and model are not violated.	

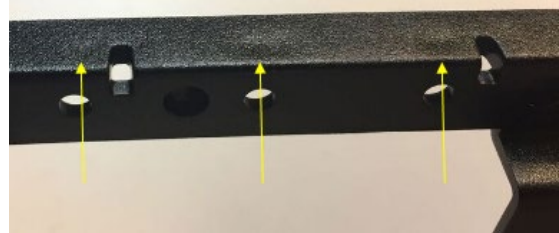
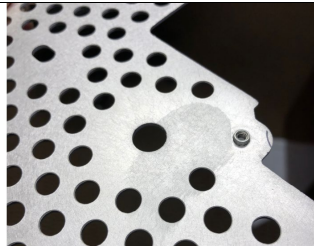
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
20	SHORT SHOT: Missing metal due to incomplete filling of the mold cavity. Parts are not completely formed. It can usually be identified by smooth, shiny and rounded surfaces.	None allowed	None allowed	None allowed	None allowed	

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Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
21	SINK: Surface depression such as voids or cavities.	None allowed	Customer Facing: None allowed. Non-Customer Facing: .015" Max. depth and cannot affect FFF and cannot affect an adjacent Class A or B surface.	.015" Max. depth and cannot affect FFF and cannot affect an adjacent Class A or B surface.	.015" Max. depth and cannot affect FFF and cannot affect an adjacent Class A, B or C surface.	
22	GREASE: Any type of machine lubrication on the surface of a part.	None allowed	None allowed	Staining is acceptable if less than .75" in any direction. No standing oil or grease.	Staining is acceptable if less than .75" in any direction. No standing oil or grease.	
23	MANUFACTURING PROCESSING MARKS: Tooling, fixturing, machining marks, chatter or lines.	None	Customer Facing: None allowed. Non-Customer Facing: Allowed if the part still meets the	Allowed if the part still meets the print/model dimensions and tolerances. Cannot affect FFF.	Allowed if the part still meets the print/model dimensions and tolerances. Cannot affect FFF.	

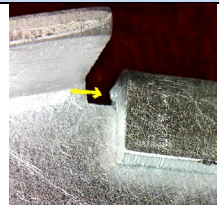
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
			print/model dimensions and tolerances. Cannot affect FFF.			
24	POROSITY OR PITTING: Holes or voids on the surface.	None	None	None	None	

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Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
25	DEFORMATION: Sheet metal bulging at folds.	None	Acceptable if it is within tolerance and does not affect FFF	Acceptable if it does not affect FFF.	Acceptable if it does not affect FFF.	

***Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.**

Table 4: Texture and coating finish

Applicable to Powder coat, paint, anodize, chem film., EMI paint, line grain.

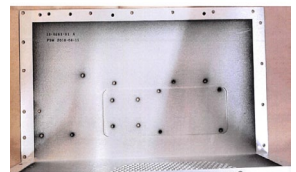
Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
26	COLOR – Color must be continuous and consistent throughout the indicated surface.	Required	Customer Facing: Required Non-Customer Facing: Can vary, unless otherwise stated. Must meet print requirements and FFF.	Can vary, unless otherwise stated. Must meet print requirements and FFF.	Varying color is allowed.	
27	TEXTURE - Texture must be continuous and consistent throughout the indicated surface.	Required	Customer Facing: Required Non-Customer Facing: Can vary, unless otherwise stated. Must meet print requirements and FFF.	Can vary, unless otherwise stated. Must meet print requirements and FFF.	Texture can vary if the part still meets the print/model dimensions and tolerances.	

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Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
28	HANGING/DRYING MARKS	Not allowed	Customer Facing: Not allowed Non-Customer Facing: Allowed if drawing FFF are met and no bare metal is showing.	Allowed if drawing FFF are met and no bare metal is showing.	Allowed if drawing FFF are met and no bare metal is showing.	No pic
29	FLAKING	Not allowed	Not allowed	Not allowed	Not allowed	No-pic
30	OVERSPRAY - Excess paint, liquid or dye media which is found in an unintended area. Overspray coverage can be from 0.00% to 100%.	Not Allowed	Customer Facing: Not allowed Non-Customer Facing: Allowed as defined by the print.	Allowed as defined by the print.	Allowed as defined by the print.	

Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	Example
31	Wrinkling/Blistering - This defect is the appearance of irregular blisters on the paint finish. Wrinkling is the development of wrinkles in the paint film as it dries, usually due to the formation of a skin.	Not Allowed	Customer Facing: Not Allowed Non-Customer Facing: Allowed as defined by appendix A.	Allowed as defined by appendix A.	Allowed as defined by appendix A.	Not acceptable example: 

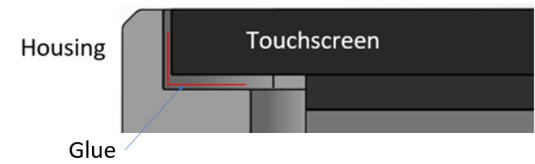
*Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.

Table 5: Dry Lubricant Coating

Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	
32	Texture –	Not Applicable	Not Applicable	Texture should be relatively smooth with little build up.	Texture should be relatively smooth with little build up.	
33	Coverage – can have interruptions in the coverage. Typically has minimum 75% coverage.	Not Applicable	Not Applicable	Hanging and drying marks are acceptable	Hanging and drying marks are acceptable	
34	Color – no specific color requirement.	Not Applicable	Not Applicable	Varying color is acceptable;	Varying color is acceptable;	No Pic
35	Thickness	Not Applicable	Not Applicable	.0000" - .0005" thickness where applicable	.0000" - .0005" thickness where applicable	No Pic

***Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering. .**

Table 6: Adhesive and Glue Surface Finish

Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	
36	Protrusion above surface: Bumps and protrusions as a result of glue curing above the nominal surface.	Not Allowed	Customer Facing: Not Allowed Non-Customer Facing: Allowed	Allowed	Allowed	Acceptable example: Glue is flush or lower than the Housing lip/Touchscreen.  Unacceptable examples: 

*Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.

Table 7: Delamination/Debonding

Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	
37	Delamination/Debonding	Not Allowed	Customer Facing: Not Allowed	Not applicable	Not applicable	

*Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.

Table 8: Gap

Defect #	Cosmetic Defect Description	Class "A" Surface*	Class "B" Surface*	Class "C" Surface*	Class "D" Surface*	
38	Gap	Not Allowed	Customer Facing: Not Allowed	Not applicable	Not applicable	 Should be .035" or less. 

***Note: all FFF (Form, Fit and Function) determinations shall be made by SPI Brea Engineering.**

APPENDIX A

Nicks:

- 1) Cannot propagate into Class A or Class B Customer Facing surface.
- 2) Cannot affect FFF.
- 3) Cannot expose bare metal (see Appendix B)
- 4) Nick size/qty
 - a. Max size .1" in any direction
 - b. Max 2 Nicks in a 1 in-square area (1"x1")
 - c. Distance between any nicks: .1" or greater.

Scratch:

- 1) Cannot propagate into Class A or Class B Customer Facing surface.
- 2) Cannot affect FFF.
- 3) Deep scratches with potential FOD are not acceptable.
- 4) Cannot expose bare metal (see Appendix B)
- 5) Scratch size/qty.
 - a. Max total length 2"
 - b. Max 2 scratches on any one surface
 - c. Min Distance between scratches: .1"

Wrinkling/Blistering:

- 1) Cannot propagate into Class A or Class B Customer Facing surface.
- 2) Cannot affect FFF.
- 3) wrinkle/blister /qty.
 - a. Max total length 2"
 - b. Max 2 wrinkles/blister on any one surface
 - c. Min Distance between wrinkle/blister: .1"

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Cosmetic Requirement of Mechanical Parts, Line Replaceable Units & Outside Antenna Equipment

APPENDIX B

Acceptable rework: Metals (Aluminum only)

- 1) Scratches, nicks dents, drag marks, etc.... that expose bare metal.
 - a. Part must meet the criteria as stated in Table 1 or 3
 - b. Exposed metal can be repaired via
 - i. Remove potential FOD.
 - ii. Treat with Alodine or similar approved process
 - iii. Provide all necessary documentation (CofC, material certs) for the Alodine or similar approved process.
 - iv. Provide SPI with a Deviation request prior to rework and shipping of parts.
 - c. Rework area cannot exceed 1" square total (or 1 % of total surface, whichever is smaller) or any length longer than 2 inches.
 - d. Structural integrity cannot be compromised.
 - e. FFF cannot be affected.

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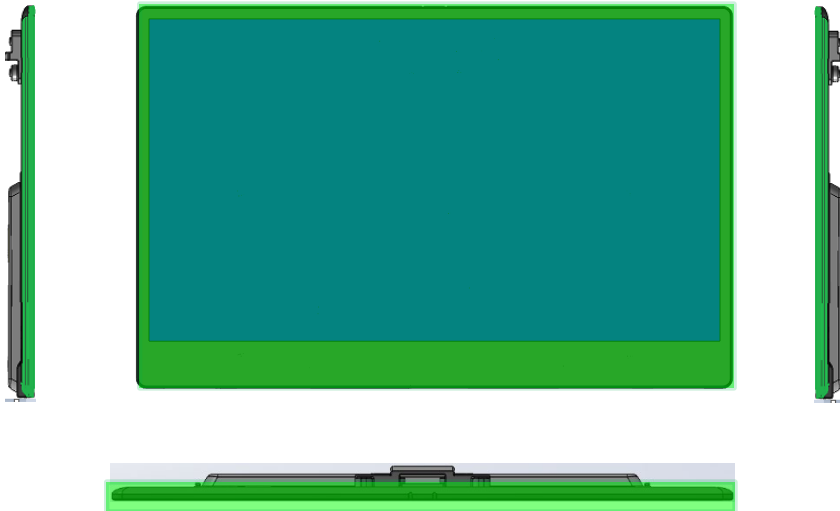
APPENDIX C

Example of Customer Facing Surfaces:

- 1) Surfaces shown below in green are considered customer-facing surfaces:

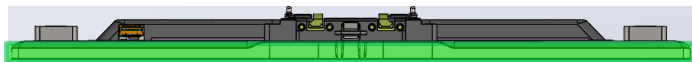
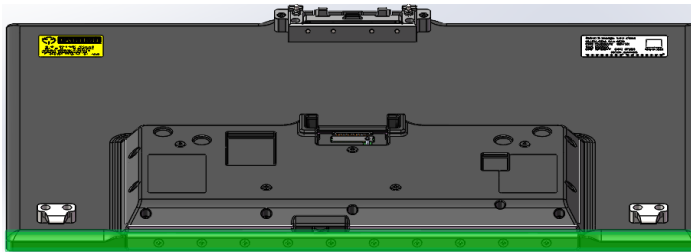
13.3" Ultra RDU

The entire front surface as well as three sides (Top, Left, Right) are considered customer facing



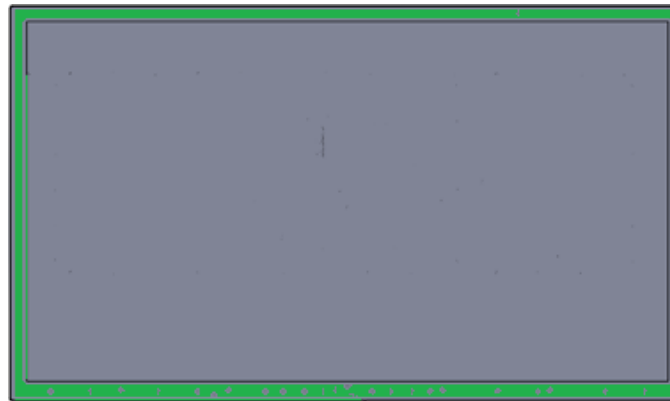
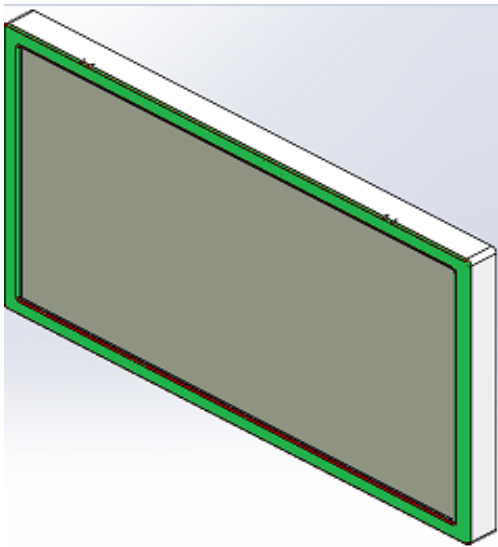
15.6", 17.3" and 24" Ultra RDU

The entire front surface as well as all four side profiles (Top, Bottom, Left, Right) are considered customer facing surfaces



27" Ultra RDU and 32" Ultra SDU

The entire front ledge is considered a customer facing surface (Not the side profiles)



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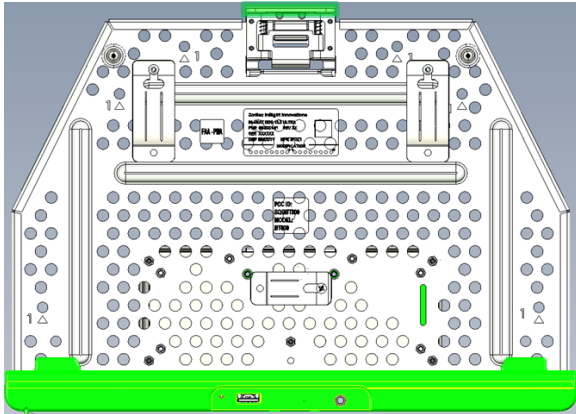
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13.3" Ultra DDS

The entire plastic chin as well as the top ledge of the latch are considered customer facing.



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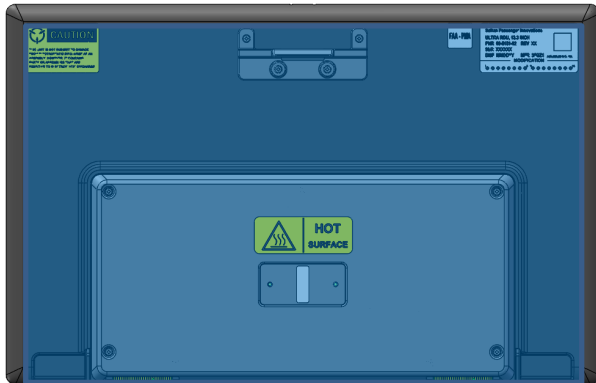


Cosmetic Requirement of Mechanical Parts, Line Replaceable Units & Outside Antenna Equipment

2) Surfaces shown below in blue are considered Non-Customer Facing surfaces:

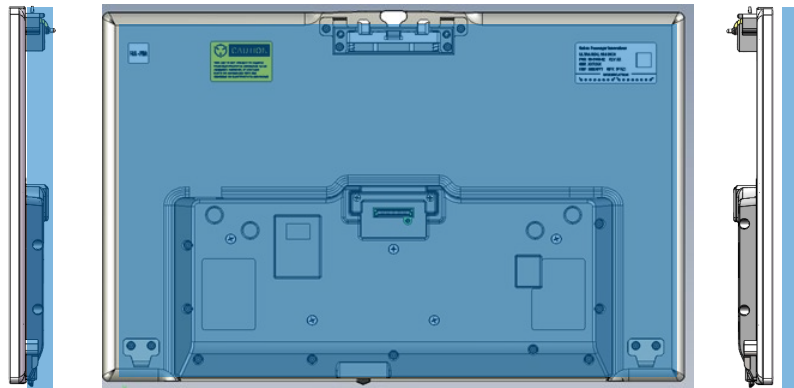
13.3" Ultra RDU

The entire back surfaces as well as the bottom edge are considered non-customer facing.



15.6", 17.3" and 24" Ultra RDU

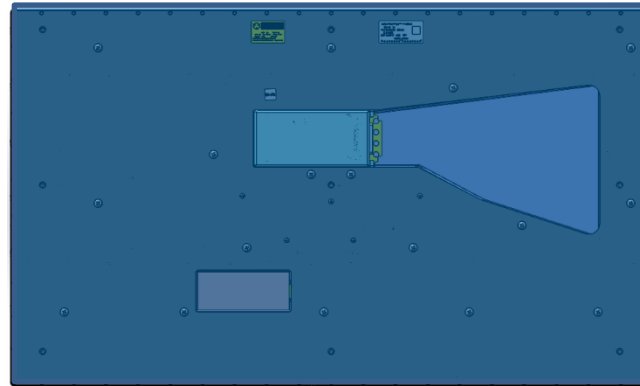
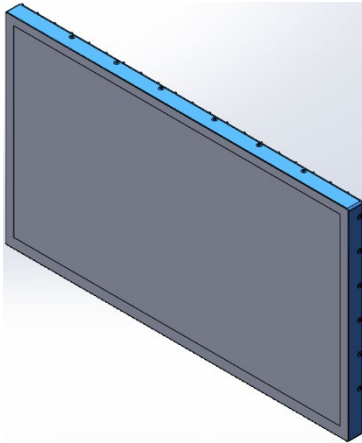
The entire back surface is considered non-customer facing.



****15.6" image shown for reference**

27" Ultra RDU and 32" Ultra SDU

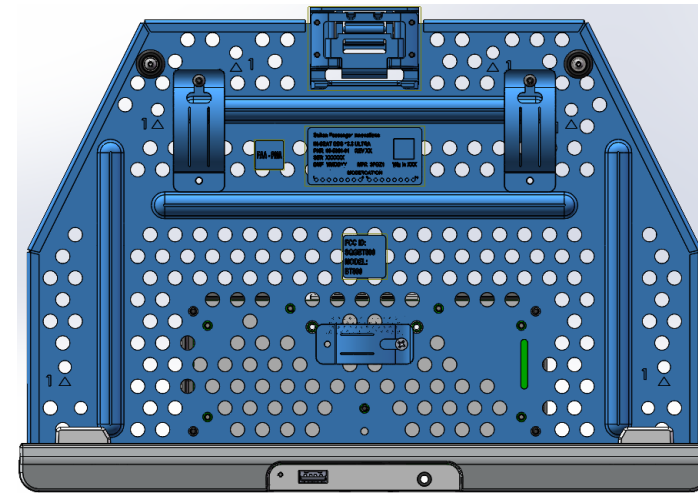
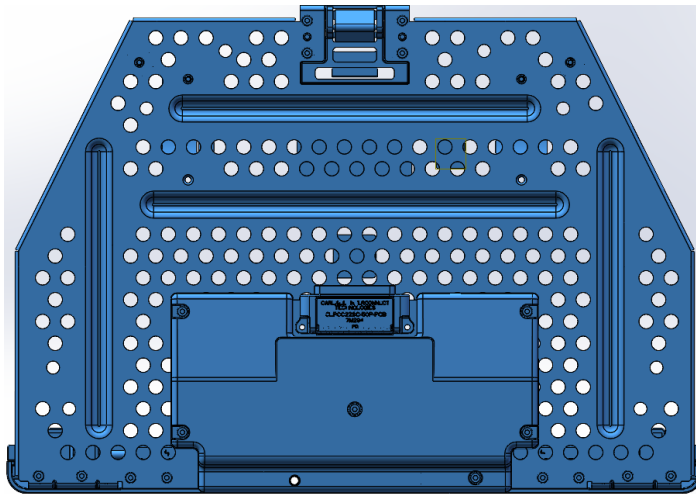
All four sides (Top, Bottom, Left, Right) as well as the back surface are considered non-customer facing.



**32" image shown for reference

13.3" Ultra DDS

The entire DDS (except for the plastic chin and top of the latch) are considered non-customer-facing.



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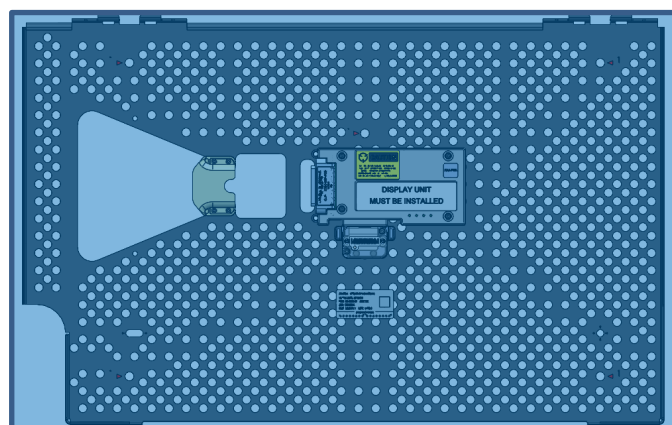
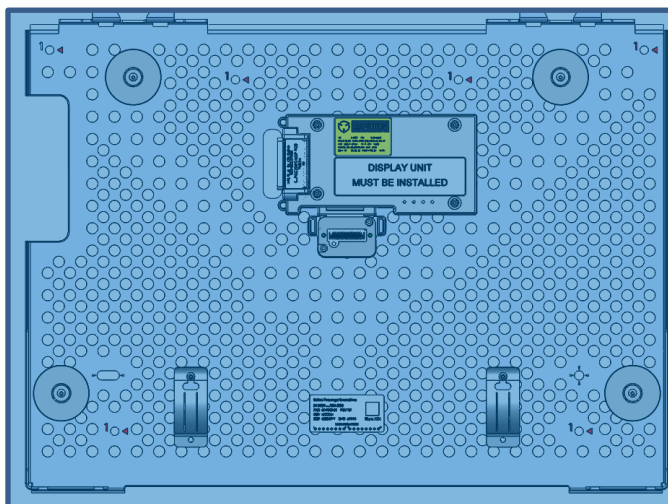
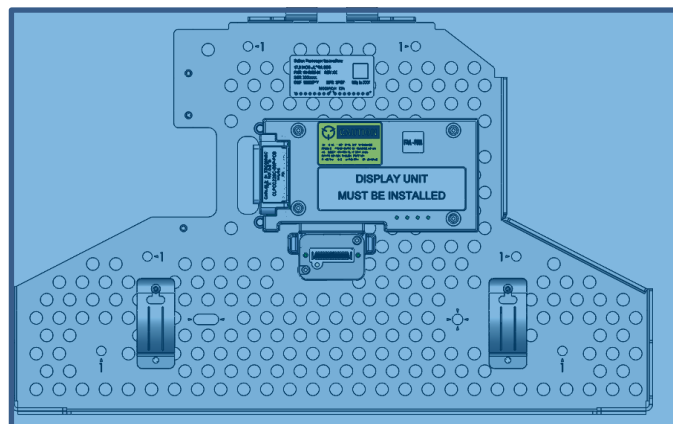
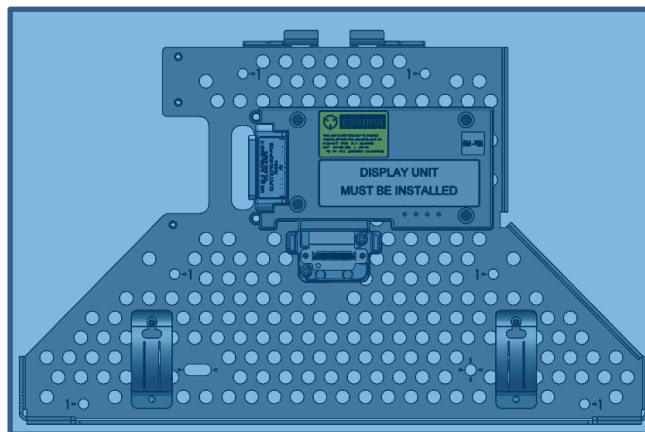
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Cosmetic Requirement of Mechanical Parts, Line Replaceable Units & Outside Antenna Equipment

15.6", 17.3", 24" and 27" Ultra DDS

The entire DDS is considered non-customer facing (front and back)



4. CATEGORY B: OUTSIDE ANTENNA EQUIPMENT (Radome, Skirt & Adapter Plate)

4.1. INSPECTION METHOD

4.1.1. Viewing Time and Distance

Viewing time indicates the duration of observation for any one surface of the part. Viewing distance indicates the distance from the inspector's eyes to the subject's surface.

Table 4.1-1: Surface Inspection Time and Distance

Inspection Time: 10 sec.	Viewing Distance: 36 in $\pm$ 2 (91cm $\pm$ 5)
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4.1.2. Viewing Angle

Viewing angles for inspection are straight at 0° or between angles of 40° to 50° depending on parts areas being inspected. Refer to Figure 4.1.2.1

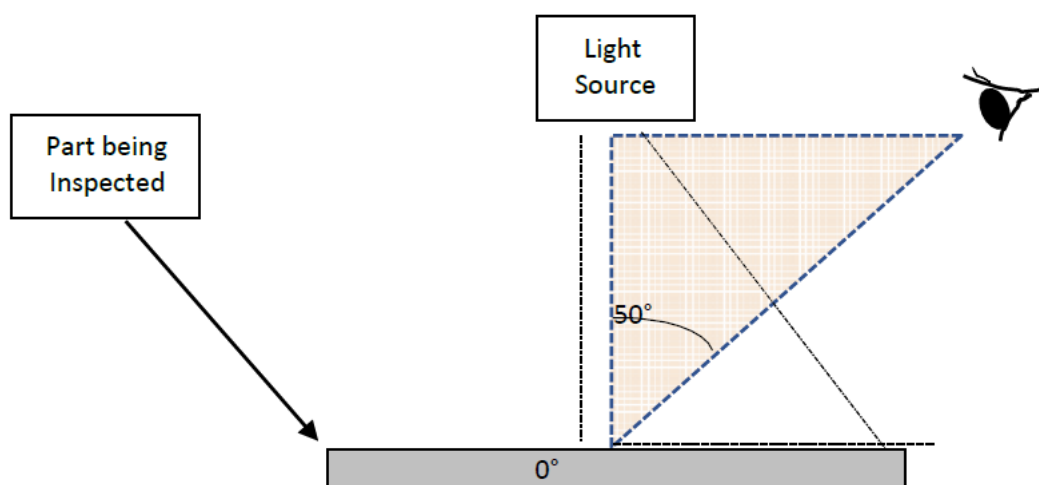


Figure 4.1.2.1: Viewing Angle

4.1.3. Inspection Tools

Visual inspection by eyes; no additional magnification should be used given the viewing distance is 36 in +/- 2 in. Scratches and abrasions that are identified through this visual inspection can be examined to determine base material damage using a Peak Eye Loupe 7X or similar.

4.1.4. Typical Light Level

The Inspection will be performed with lighting level between 750–1500 Lux (75–150 Foot Candles) for the Inspection Area.

NOTE: The use of higher intensity focused light sources such as flashlights or magnification is not permitted.

4.2. ADVANCED PAINT TECHNIQUE, ALLOWANCES AND CLARIFICATIONS

PAINT APPEARANCE ALLOWANCES:

- A paint supplier may use advanced paint techniques such as “encapsulating edges”. This consists of painting down the outside, over the edge and 1-2 mm up the inside wall. This practice encapsulates the edge and provides a bond that is stronger, prevents flaking and chipping from the edge, and is acceptable.
- Encapsulating edges may also be used for holes. The small amount of paint surrounding each hole on the interior surface is acceptable.

- The use of “Air gap masking” on the internal side of the holes is a technique to prevent paint from building up within the hole. This technique may result in some minor overspray on the inside surfaces or in the area around the holes, which is acceptable.

ALLOWANCES:

- Drawings that state specific holes to be free of paint must be masked and/or plugged during the painting process. Minor flakes, paint hairs, and other artifacts that cannot be seen without magnification from 3 feet are acceptable.
- Minor overspray in limited amounts is acceptable if they do not cover any of the circular segments on the lightning diverter strips.

4.2.1 Coated/Painted Surface/Finish Rework

Paint peel-off, scratches, and surface damage which penetrate through paint or protective treatment surfaces/coatings, causing the base material to be exposed, but not damaged, are not acceptable but may be reworked with application of the same paint specified on the radome, skirt and adapter plate manufacturer’s part list. Further defects are defined in Table 4.2.2.1 and the criteria defined in Table 4.2.2.2. Example photos for reference can be found in Appendix D.

4.2.2 Definitions for Defects on Painted Surfaces**Table 4.2.2.1 Surface Blemish Types and Descriptions**

Defect Name	Alternate Name	Description
Blister	Blistering	A localized area where the surface finished did not adhere to the base material.
Bubble		A balloon-like surface.
Crack	Split	A separation within the material.
Fisheye		Small surface defects are usually circular in shape.
Cut	Slice	Small incisions made from a tool or sharp object.
Dent	Nick	A surface depression or small gouge in the base material.
FOD	Particulates	Foreign object(s), debris, particulates, or impurities affecting the cleanliness or integrity of surfaces.
Fibers	Antistatic Fibers	These fibers appear as short strands or sometimes as “clumps” through the topcoat and are acceptable on radomes and skirts.
Gouges		A surface defect with depth resulting in the removal of base material.
Orange Peel		Orange Peel is the formation of uneven, irregularities in paint surface.
Overspray	Splatter	Resulting from the light application of coating material or paint onto an unintended location.
Paint Run	Drip	Excessive coating build-up causes a drip or bubble.
Pin Hole	Pit	A pore-like penetration that is present in finish.
Scratch		Superficial surface defects without depth.
Void	Bare Spot	An area that is absent of coating or paint.

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Table 4.2.2.2 Inspection Criteria on Defect Types

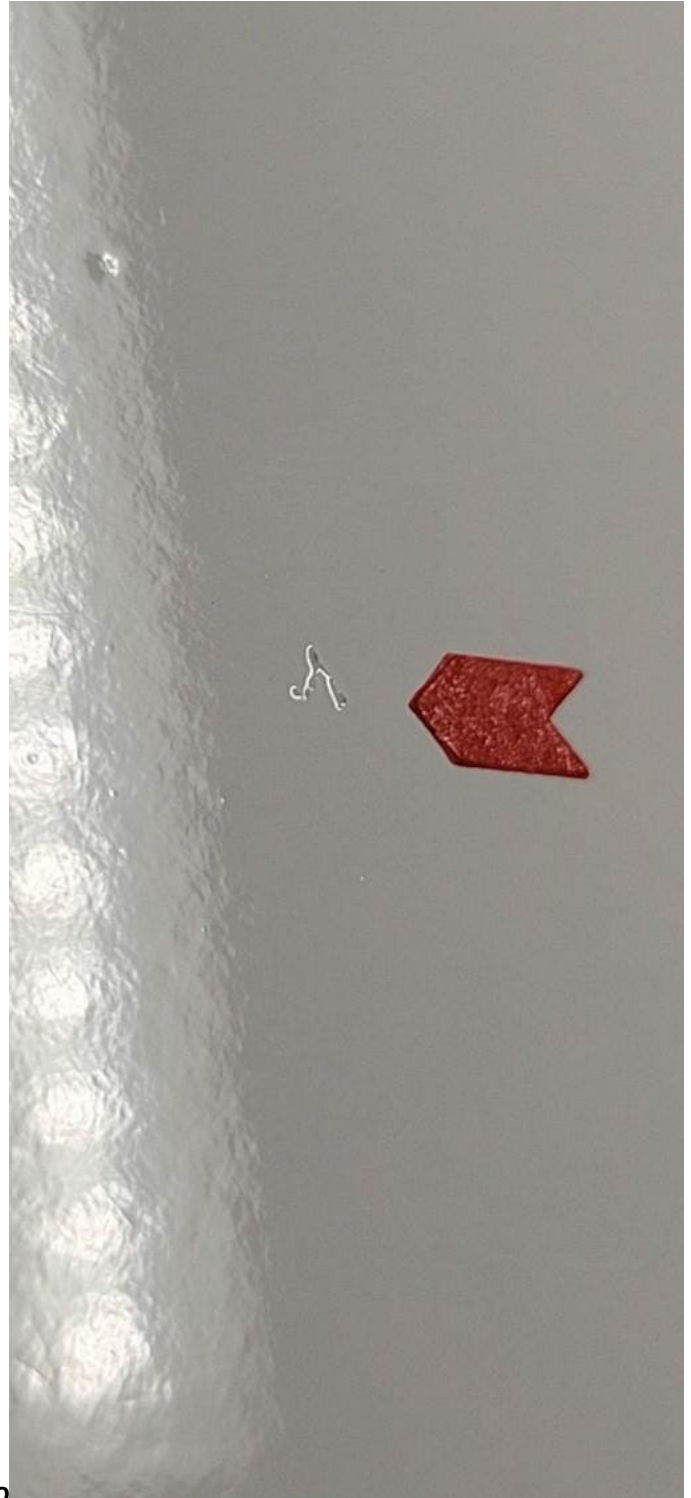
Defects satisfying the measured size criteria are acceptable.

Defect Types	Criteria	Note	Radome	Skirt	Plate
Dents	Not allowed if it removes paint layer and exposes base material or if base material is exposed. Otherwise, defects of sizes up to 0.5" L x 0.5" W are allowed. Max 10 defects per sq. ft.	No exposed base material.	√	√	√
Fibers	These fibers appear as short strands or sometimes as "clumps" through the topcoat and are acceptable on radome and skirt.	See Appendix D – Image 1	√	√	NA
FOD	10 particles of foreign material are allowed per square foot if they are not greater than 0.03 inches in diameter or .02 inches high. or two particles are allowed per square foot if they are not greater than .05 inches in diameter or .02 inches high. Both the .03 and .05 criteria cannot be used on the same part.		√	√	√
Pin Holes	No more than 10 per sq ft (0.030" each)	Pin holes are defined as less than 0.020" in diameter. No exposed base material	√	√	√
Blisters, bubbles	Not acceptable	Some rework may appear to be a bubble. Bubbles will be soft to touch	√	√	√
Fisheyes	Fisheyes are acceptable as long as the substrate surface is not exposed and do not cover more than 20% of the surface of the coated part.	See Appendix D – Image 2	√	√	√
Bare Spots	Not allowed.	Missing paint coverage	√	√	√
Crack	Not allowed if base material is exposed. Otherwise, defects of sizes up to 1" L x .020" W are allowed. Max 10 defects per sq. ft.	No exposed base material	√	√	√
Gouges	Not allowed.	Gouges are detected before paint application.	√	√	√
Orange Peel	Not allowed on Rx and Tx Window area (top of radome), otherwise allowed. Radome window areas shown in Appendix D.	See Appendix D – Image 3 & 6 For Skirt & Adapter Plate, Allowable however, it shall not be so obvious as to suggest inferior workmanship or processing and it shall not adversely affect form, fit or function.	√	√	√
Overspray	Not allowed if diverter segments on lightning diverter strips are covered. Lightning diverter strips shown in Appendix D.	See Appendix D – Image 4 & 7 For Skirt & Adapter Plate, Allowable however, it shall not be so obvious as to suggest inferior workmanship or processing and it shall not adversely affect form, fit or function.	√	√	√
Paint Runs	Not allowed on Rx and Tx Window area (top of radome), otherwise allowed within tolerance requirements of the drawing. Radome window areas shown in Appendix D.	See Appendix D – Image 5 & 6 For Skirt & Adapter Plate, Allowable however, it shall not be so obvious as to suggest inferior workmanship or processing and it shall not adversely affect form, fit or function.	√	√	√
Cuts, Scratches	Not allowed if base material is exposed. Otherwise, defects of sizes up to 1" L x .020" W are allowed. Max 10 defects per sq. ft.	No exposed base material	√	√	√

APPENDIX D – Example of Defect Photos (For Reference Only)

Fiber (Image 1)

This is a magnified photo, and SPI does not consider this as FOD however the ideal surface condition should be smooth and free of visible fiber.



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Fisheye (Image 2)



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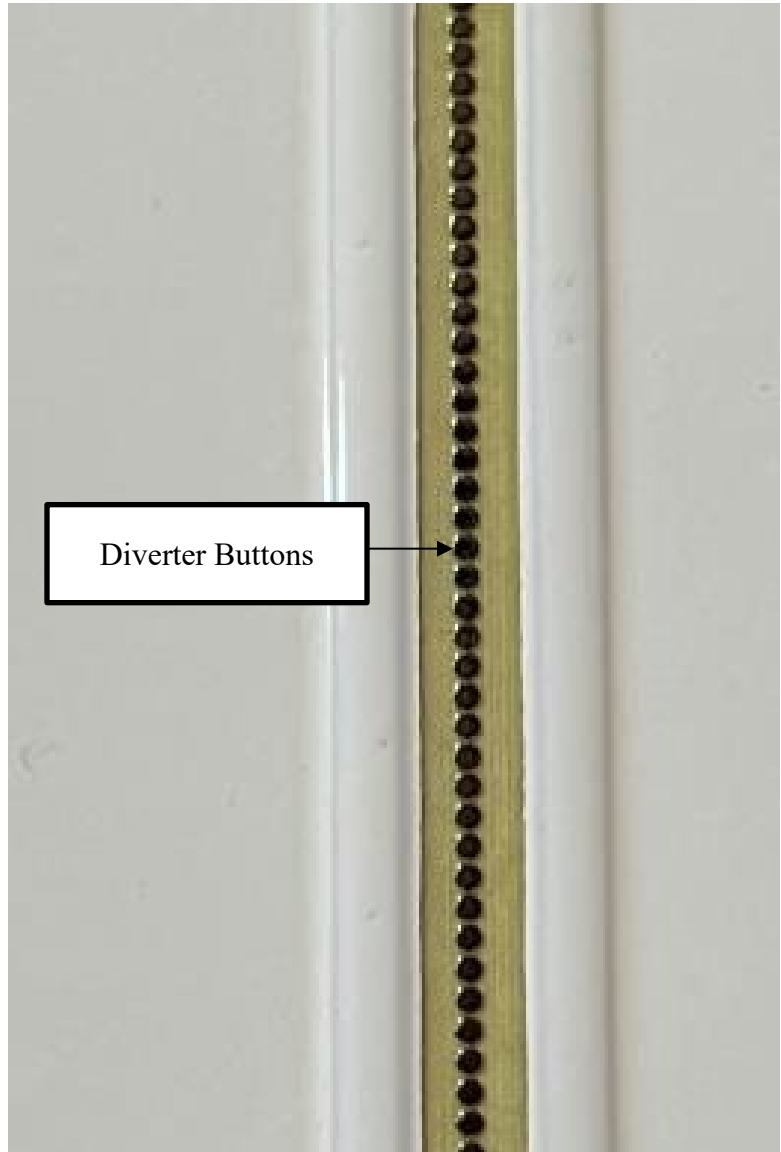


Cosmetic Requirement of Mechanical Parts, Line Replaceable Units & Outside Antenna Equipment

Orange Peel (Image 3)



Overspray on Diverter (Image 4)
Diverter Strips should be free of paint.
[Acceptable example on the right]



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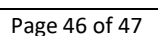
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Paint Run / Drip (Image 5)





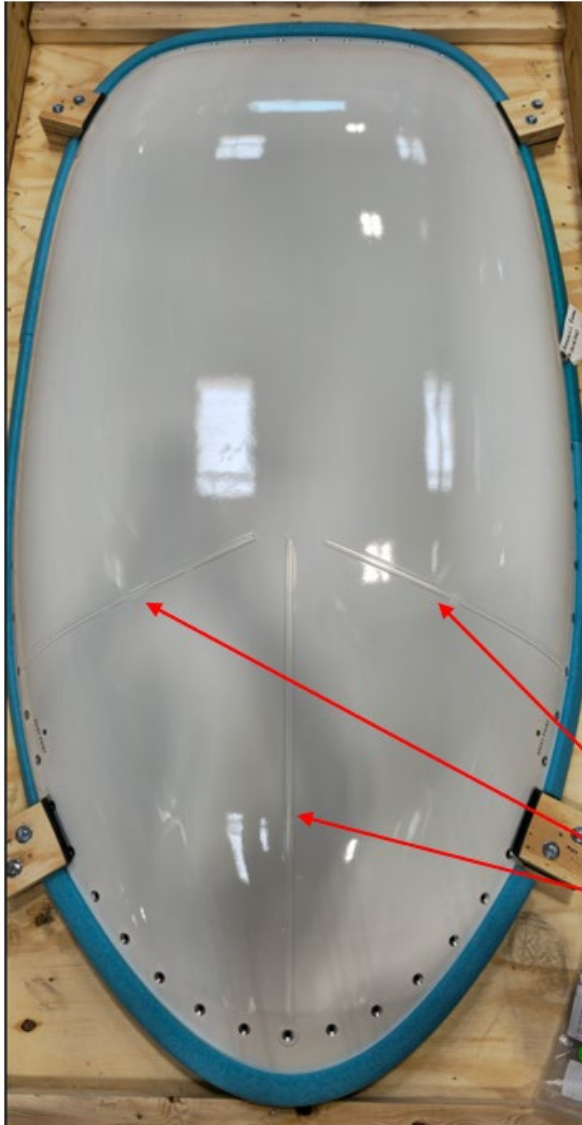
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Cosmetic Requirement of Mechanical Parts, Line Replaceable Units & Outside Antenna Equipment

Lightning Diverter Strips (Image 7)



Lightning Diverter Strips